In response to the rejection of claim 4 as being unpatentable over Austen-Brown (US 2003/0094537) in view of G. C. Celayan (3,514,051):

The aircraft described in Austen-Brown shows two lifting mechanisms arranged in tandem order on the left side of the main body in the form two engines with blades fitted to each engine (2, 4, 17b, 17d)) and two more lifting mechanisms arranged in tandem order on the right side of the main body in the form another two engines with blades fitted to each engine (1, 3, 17a, 17c).

You stated on line 11 of page 4 of your report that the secondary tilt enabling joint is able to tilt in an opposite direction to the primary tilt enabling joint in Austen-Brown. However, the tilting is not opposite. Both tilt enabling joints rotate in the same direction during transission from hover to forward flight. To engage in forward flight from hover, both engines 2 and 4 would be rotated in the same anti-clockwise direction - similar to the operation of the Curtiss-Wright X-19A of 1960. The only difference is that on the Curtiss-Wright during hover the rotors were on top of the rear engines and in the case of Austen-Brown the rotors are on the bottom of the rear engines. During transission to forward flight the lifting mechanisms on the Curtiss-Wright were rotated (tilted) in the same direction. To test the direction of tilting, tilt measuring devices could be connected to the engines of Austen-Brown, such as spirit levels. If spirit levels were connected to the engines 2 and 4 while the engines were positioned for forward flight as in Fig. 1, and then the engines were tilted slightly in preparation for hovering flight, the spirit levels would show that the slight amount of tilt was in the same direction.

Furthermore, the tilt enabling joints in Austen-Brown are not designed to tilt in lateral directions.

The aircraft in claim 4 of my application gains flight by using a primary lifting mechanism and a secondary lifting mechanism, that is, two lifting mechanisms, arranged in tandem order. For the aircraft in Austen-Brown to be comparable to the aircraft of claim 4 if the reference to a jet engine in claim 4 was ignored, the aircraft in Austen-Brown would have to be able to achieve flight by using only one forward rotor and one rear rotor, and the rotors would have to be able to be tilted laterally. However, if the aircraft in Austen-Brown relied on only one forward rotor and one rear rotor (17b, 17d), positioned on one wing (left side), the aircraft would not be able to achieve flight. It would simply be flipped over onto its roof.

The aircraft in Celayan shows jet engines which tilt in the same forward or reaward direction. There is no suggestion that the jet engines could tilt laterally or in opposite directions.

In response to the rejection of claim 4 as being unpatentable over Serriades (3,282,534) in view of Brady (3,985,320):

In lines 3 to 5 on page 5 of your report you stated that the primary lifting mechanism in Serriades, an engine assembly, comprises a rotor, blades, and blades, on the grounds that it is inherent that jet engines have rotors, blades as well as stators. However, the blades and rotor in a jet engine are an integral part of a jet engine that uses blades to provide compression. That is, without the blades and the rotor, such a jet engine would not function. In claim 4 of my application the rotor and blades are seperate from a functioning engine assembly. Claim 4 states that the primary lifting mechanism comprises a rotor, an engine assembly, and a plurality of blades. The rotor and the blades are rotated by the engine assembly. The engine assembly could be a piston engine, an electric motor or a jet engine. Line 9 of page 44 in my application stated that the primary lifting mechanism was able to exert an upward force on the forward end of the main body of the aircraft by forcing air in a downward direction by way of the blades rotating around the rotor. That is, the upward force is not created by jet exhaust being forced in a downward direction.

The secondary lifting mechanism referred in my claim 4 is a jet engine. Claim 4 does not make any reference to a rotor or blades forming part of the secondary lifting mechanism.

With respect to Brady, Figure 1 in Brady shows two rotors with rams connected to the rotors. However, it cannot automatically be concluded from Figure 1 that the rotors are tiltable in opposite directions. Brady states that the rotors are tilted forward to gain forward movement. Brady describes a device for the shifting the centre of gravity, either to stabilize the aircraft or to move the centre of gravity in order to effect a change in the direction of travel of the aircraft. That is, while he has referred to tiltable propellers for gaining lift and gaining movement in one direction, his main concern has been with his mechanism for shifting the centre of gravity.

An examiner in Australia has referred to three patents as prior art during an examination in Australia. These patents are:

1/ US 1,491,310 by E. Perrin, April 22, 1924
2/ US 2,233,747 by A. Reidl, March 4, 1941
3/ US 3,905,565 by H. G. Kolwey, September 16, 1976.

These do refer lifting mechanisms consisting of rotors and rotating blades that force air in a downward direction to gain lift, with the rotors being tiltable in opposite directions.

However, none of these patents refer to the use of jet propulsion for gaining vertical lift, with exhaust gases being directed in a downward direction. Patent numbered 1,491,310 (US) by E. Perrin has been in existence for over 75 years, patent numbered 2,233,747 (US) by A. Reidl has been in existence for over sixty years and patent numbered 3,905,565 (US) by H. G. Kolwey has been in existence for over 25 years. If it is argued that in 2002 it would have been obvious to someone skilled in the art to therefore concieve the possibility of tilting a jet engine laterally relative to the main body of a vertical take-off aircraft, and also in a direction that is opposite to the lateral tilting of a rotor that forces air in a downward direction by way of rotating blades, then these concepts should also have been obvious for more than thirty five years, since Perrin's patent and Serriades' patent have co-existed for more than thirty five years and have been accessable to persons skilled in the art during those thirty five years.

In most patent application examination cases a hypothetical person skilled in the art would have to be imagined. However, in view of the great number of persons skilled in the art who have for more than forty years attempted to conceive the optimum type of aircraft that can take off and land vertically and fly like an airplane, it should only be necessary to look at history to see what persons skilled in the art have actually conceived. That is, what the many aircraft designers and manufacturers over the past decades have conceived.

For over forty years many persons skilled in the relevant art have been conceiving various forms of vertical take-off and landing (VTOL) aircraft in an endeavour to provide a VTOL aircraft that could be efficient and quick in forward flight as a fixed wing airplane while also being able to take-off and land like a helicopter. Books on aviation history contain many examples of the various types of aircraft that have been conceived over the past fifty years. Vast amounts of money have been spent over the years on researching (VTOL) aircraft and constructing experimental aircraft, many of which were subsequently found to be impractical and were discarded, and many patents dealing with VTOL aircraft have been applied for, and many have been granted. Many of the aircraft conceived in the past involve tilting motions of various forms of lifting mechanisms. Examples with tilting lifting mechanisms include:

1/ Curtiss-Wright X-19A with quad tilting propellers (1960). This concept has re-appeared in the form of a proposed aircraft with four tilting turbo props, being promoted by Bell, essentially a Bell Boeing V22 Osprey with an extra set of wings and turboprops.

2/ Bell X-22A with quad tilting ducted propellers, plus fixed jets engines for extra forward propulsion (1966).

3/ Canadair CL-84 with rotors mounted on a tilting wing, and a horizontal tail rotor to provide control over the pitch of the main body (1965).

4/ LTV-Hillier-Ryan XC-142A tilt wing transport aircraft with rotors on the wing.

5/ Hillier X-18 tilt wing with rotors on the wings.

6/ Boeing Vertol Model 76/VZ-2A, with rotors on tilting wing (1957).

7/ Nord 500, with tilting ducted fans, one on each side of the body (1968)

8/ Bell XV-3 with tilting helicopter type rotors mounted on wings, and an engine in the main body (1955).

9/ The Bell XV-15, with tilting turboprops on a wing (1977).

Then there are the various types of aircraft that used thrust vectoring and other aircraft that used a combination of lifting mechanisms that were fixed in place for vertical lift combined with other propulsion mechanisms for forward travel. Some examples include:

1/ Piasecki VZ-8P Airgeep with ducted fans in tandem order (1958).

2/ Hawker Siddeley Harrier with thrust vectoring (1960)

3/ Convair XFY-1 vertical take-off tail sitting aircraft with counter-rotating propellers in the nose section (1954).

4/ Lockheed XFV-1 similar to the Convair XFY-1 (1954).

5/ Ryan X-13 Vertijet, vertical take-off jet airplane, suspended by hook prior to take-off (1956).

6/ Dornier Do 31E, with thrust vectoring main jet engines, and eight additional lifting only jets (1967).

7/ Lockheed XV-4A Hummingbird with fans for vertical take-off and and a fixed jet engine for forward propulsion (1962)

8/ Short Brothers & Harland SC.1, with four lifting jet engines and one jet engine for forward flight (1958)

9/ Bell X-14 with thrust deflectors to direct exhaust from two fixed jet engines (1957).

10/ The Coleoptere, by SNECMA of France, a piloted jet engine in a circular wing (1959).

11/ Dassault Mirage 111-V fighter, with eigth lifting jet engines and one jet engine for forward propuslion (1962)

12/ Boeing-Vertol Model 347, a modified CH-47 with a massive tilting wing (1970).

These aircraft show the determination of persons skilled in the art to concieve aircraft capable of vertical take-off and land, and as well as forward flight.

To my knowledge, VTOL aircraft with jets engines tilting laterally relative to the fuselage have not been constructed or conceived, nor have aircraft with a jet engine being tilted in an opposite direction to the tilting of a propeller. A propeller merely forces air, while a jet engine forces out hot gases in a concentrated area that can be damaging to aircraft bodies. A tiltable propeller can be fitted to an aircraft so that air is directed over wings or over the main body. A tiltable jet needs to be fitted so that in any position the hot gases are not directed at the wings or the main body. That is, the configuration for fitting a tiltable jet for vertical take-off is different to the configuration for fitting a propeller for vertical take-off. Hence it would not be obvious to merely remove a propeller and engine used for vertical take-off and in their place fit a jet engine - as history has shown.

With respect to Serriades, there is nothing to suggest tilting of the jet engines laterally with respect to the main body. The engines are fitted for forward tilting on wings 19, 20, similar to the case of Celayan, to gain forward speed, while also being able to provide vertical lift. The wings 19, 20 in Serriades are fixed in place. And the four tilting jets in effect result in an aircraft with two sets of lifting mechanisms arranged in tandem order. One set on the left side of the main body, and one on the right side of the main body.

My understanding is that the US Army and US Navy (US military) have had a need for decades for a troop transport aircraft that can take-off and land vertically like a helicopter and then fly quickly like a normal fixed wing airplane for a great distance. The best concept that has been made available to the US military by US aircraft manufacturers is the Bell Boeing V22 Osprey. The V22 Osprey is based on a concept that is fifty years old. The concept was conceived in the 1950's in the form of the Bell XV-3 and the XV-3 first flew in 1955. After all of these years, the best concept that US manufacturers (who employ persons skilled in the art) have been able to present to the US military is a concept that is 50 years old - tiltable variable pitch rotors mounted on the wings. The only conceptual difference between the V22 Osprey and XV-3 is that the XV-3 had an engine housed in the fuselage, while the V22 Osprey uses a turboprop on each wing.

The V22 has been in development for some 20 years, and I beleive that it has not yet become a combat ready aircraft. Four experimental aircraft have already crashed, and many people have been killed in those crashes - one crash occurred during a vertical descent. An article appeared in a magazine called Aircraft & Aerospace, in the June 2001 edition, titled "Tilting in the wind", pages 50 to 53. That article referred to the findings by the US General Accounting Office. The article reads in part:

> " The Bell Boeing V22 Osprey, under official development since 1986 and the US Department of Defence's sixth-largest weapons programme, came under fire from the Congressional accounting watchdog, the General Accounting Office. The GAO report casts doubt on the safety and reliability of the V22 Osprey - specially the MV variant for the US Marine Corps that was involved in the two crashes in April and December last year in which a total of 23 soldiers were killed - and warned that cutbacks in critical tests indicated widespread and systematic problems with the program".

The article stated that $10billion had already be spent on the program, and hence was too expensive to cancel, that a further $2billion was to be spent in September 2001, and that the tilt-rotor was not ready for series production.

The article stated that "The V22 has its genesis in almost 50 years of work by the US military, NASA, and the aviation industry, and came out of the general melting pot of experiments with vertical flight.... ....Bell and Boeing teamed to develop the Osprey in 1982.....".

I haven't read the report on the V22 by the General Accounting Office, but I believe it would be accessable to you should you wish to read it.

The V22 is an extremely complex machine, and is based on a concept that results in an unstable aircraft if variable pitch rotors are not used. The pitch of the main body is controlled by varying the pitch of the rotors. Yaw and roll are also controlled by varying the pitch of the rotors. The Canadair CL-84 which had a tilting wing used a horizontal tail rotor to maintain balance during hover. With huge raised tail wings, the V22 could be extremely dangerous if it is operated in hover mode in strong winds that change directions suddenly. A sudden strong wind from behind while the V22 is in hover mode could send the V22 crashing into the ground as it is tiled forward by the wind, if the pitch of the rotors isn't strong enough to counter the effect of a strong wind gust from behind.

By placing rotor above the forward end of the main body and a jet above the rear end of the main body, as is shown in the illustration relating to claim 4, rolling of the aircraft is overcome without variable pitch rotors since the weight of the main body is suspended directly below the lifting mechanisms. Yaw is controlled by lateral tilting of the lifting mechanisms in opposite directions, and pitch of the main body is controlled by varying the relative lifting forces of the lifting mechanisms. The aircraft of claim 4 is a simple yet stable vertical take-off and land aircraft that could be constucted easily - a propeller and engine at the front above the main body and a commercially available jet engine at the rear. A fuselage already being constructed for other aircraft could even be used as the main body. The tilt enabling joints could be made from tubes, and commercially available hydraulic actuators.

By having at least one jet engine at the rear that can be tilted forward and provide forward propuslion, it would be able to travel faster that the V22 Osprey which uses propellers only. Hence the aircraft of claim 4 could deliver troops and supplies to a battle zone faster than the V22, and evacuate wounded personnel quicker.

By having the jet engine at the rear end and a large rotor at the front end, large wings can be placed at the rear of the aircraft without loss of lift being caused by downwash over wings from rotor blades. The large wings can be used to provide lift during forward flight, so that the jet engine can be tilted completely forward, and the rotor would force airflow over the wings in forward flight. The wings could be shaped in a similar manner to those on the Harrier VTOL jet fighter, a proven design - such wings are not practical on the V22 Osprey. By contrast, during hover, the rotors of the V22 Osprey force air over the wings, and it has been estimated that at least 9% of the potential lifting ability of the V22 Osprey is lost becuase of the rotor downwash over the wings.

If the concept claimed in claim 4 was obvious due to Serriades in view of any one of Perrin, Reidl or Kolwey, then the obvious question that comes to mind is why the US military hasn't been presented with the concept aircraft that appears in claim 4, considering that the US has many people skilled in the art of aviation.

Accordingly, I request that you reconsider your rejection of claims 4, 5 and 6.

With respect to the election of the species for prosecution, the selection was based on a choice of figures 1, 3, 4, 6, 7, 8, 9, or 10. By limiting the species selection to these figures, other aircraft with other lifting mechansisms and combinations thereof, discussed in narrative form, seem to have been excluded. The narrative in the specification contained reference to additional aircraft types - including the use of mulitples jet engines, and combinations of aircraft where a turboprop is mixed with rotors being rotated by an engine assembly.

Species selection was performed in haste. I have cancelled claims 1-3, 16-21, 26-29, 31, 33-35, 37, 40, 41, 43-52, 59-85 and 87-89.

I would appreciate it if the remaining claims be regarded as being readable on the elected species, and be considered as to allowability. Some of the remaining claims refer to the use of multiple jet engines for the secondary lifting mechanism, and combining a turboprop with a jet engine(s), configurations which weren't illustrated, but were referred to in narrative form (pages 7 to 10 of the description).

Claims 7, 10, and 13 have been re-written in a similar manner to the manner is which claim 4 has been re-written, with a slight variation since claims 10 and 13 refer to a turboprop being used for the primary lifting mechanism. Claims 7 and 13 refer to the use of multiple jet engines for the secondary lifting mechanisms.

Claims 5, 6, 22, and 23 depend on claim 4.

Claims 8, 9, 22 and 25 depend on claim 7.

Claims 11 and 12 depend on claim 10.

Claims 14 and 15 depend on claim 13.

Claims 30, 32, 38, 42, 56 and 86 have been amended so they are dependent on anyone of claims 4 to 15 or 22 to 25.

Claims 36, 39, 53, 54, 55 and 58 remain as original.

Claim 57 has been amended to correct the spelling of the word "lifting" (incorrectly spelt on line 18 of page 82 of the original application).

I believe that new matter has not been added and hence make the statement that new matter has not been added.

Yours sincerely,

T. Kusic